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Date of Application, 25th Oct., 1900

Complete Specification Left, 1st July, 1901—Accepted, 10th Aug., 1901

PROVISIONAL SPECIFICATION.

“Improvements in or relating to Photographic Film Cartridges and the like”

(A communication from MATTHIAS J. EHLMAN of Rochester in the County of Monroe, State of New York, United States of America).

We, KODAK LIMITED of 43 Clerkenwell Road, in the County of London, Manufacturers of Photographic Materials, do hereby declare the nature of this invention to be as follows:—

This invention relates to photographic film cartridges and the like and has for its object to provide a film-roll or cartridge of such a nature that after making one or any predetermined number of exposures, the operator may remove the exposed portions of the film in daylight and proceed to expose the remainder without danger of fogging either the exposed or unexposed films.

Strips or pieces of flexible sensitive photographic film of suitable material and of sufficient length for one or more exposures are attached to a backing strip of some opaque substance, preferably black paper. These film strips are attached at intervals to the backing strip, being secured at one end only, preferably by pieces of paper gummed to the film strip and to the backing strip. The film strip is preferably perforated beneath the paper, the gum passing through these perforations. The first film strip is secured at a sufficient distance from the forward end of the backing strip so as to provide for several convolutions around the complete cartridge to protect it, and also to extend from the supply to the winding spools in the camera for which the cartridge is adapted. The distance between the rear end of the first film strip and the forward end of the second film strip is such that a multiple film cartridge is formed having a common backing strip of flexible opaque material to which the film strips are separately applied.

The backing strip is partially divided or weakened at points midway between the approximate ends of the film strips so that the separate film strips and backing for them may be divided into separate complete cartridges and the film still be protected from the action of light when applied to or removed from the camera. The backing strip may conveniently be weakened by forming V-shaped notches at the edges which not only serve this purpose, but also when the backing is severed leave the strip with a tapering end that may be easily threaded through the slit on the spool.

The rear or outer surface of the backing may be provided with suitable numbers for indicating the separate exposures of film and marks to show where the film and paper are to be severed if it is desired to separate the exposures before development. The film strips are attached at intervals to the backing strip so that when a film strip has been wound upon the spool a sufficient length of backing strip is next wound round the spool to protect it from the light before the next film strip is wound upon the spool. The result is that a film strip may be severed from the others without danger of fogging the unexposed or exposed films.

In order to facilitate securing the loose ends of the backing strip when a portion containing one or more of the film strips is removed from the camera or holder, small strips of gummed paper may be provided. These pieces of gummed paper are secured at one end to the rear or outer surface of the backing strip and extend across the weakened portion of the latter so that when the backing is

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severed at the weakened line the gummed paper may be moistened and wrapped round the roll of exposed films, holding the loose or free end of the backing and preventing its unwinding.

If desired the backing strip may be wholly severed at the weakened portions or two separate backing strips connected by securing the free ends of the gummed strips. In this case the gummed strips may serve the double purpose of connecting the pieces of backing strip and also when a backing strip has been severed the gum strip may be used to attach the loose end of the strip around the roll.

Dated this 25th day of October 1900.

BOULT WADE & KILBURN,
Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in or relating to Photographic Film Cartridges and the like

(A communication from MATHIAS J. EHLMAN, of Rochester, in the County of Monroe, State of New York, U.S.A.)

We, KODAK LIMITED, Manufacturers of Photographic Materials, of 43, Clerkenwell Road, in the County of London, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to photographic film cartridges for use in daylight loading cameras or roll holders and embodying a strip of sensitive film and a longer strip of opaque paper containing in its rear side numbers indicating the separate exposures and lines for indicating the points of severance of the film into separate exposures for development. The cartridges or film rolls placed upon the market heretofore have usually contained film sufficient for twelve exposures, but in one continuous strip, so that after the cartridges or film roll had been placed in the camera or roll holder, and one or more exposures had been made, it was necessary to expose or at least to round over to the receiving spool the whole strip before the exposed portion could be removed for development, or else to waste a large portion of the film by opening the camera. The invention, therefore, has for its object to provide a film roll or cartridge of such a nature that after making one or any predetermined number of exposures, the operator may remove the exposed portions of the film in daylight, if desired, and proceed to expose in the camera the remainder, without danger of fogging the exposed or unexposed film, or, if desired, he may wait until all the film has been utilized in making exposures, and then remove the cartridge and develop all of it at one operation.

To this end the invention consists in certain improvements hereinafter described, the novel features being pointed out in the claims at the end of this specification.

In the accompanying drawings:—

Figure 1 is a perspective view of strip of opaque backing or covering material and the film forming the main portion of the improved cartridge.

Figure 2 is a similar view of the rear side of the opaque covering strip showing the markings thereon.

Figure 3 a similar view of a cartridge spool of the ordinary or any preferred construction.

Figure 4 a view of a modification.

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Similar reference letters in the several figures indicate similar parts.

A, A¹, A², etc., indicate strips or pieces of flexible, sensitive photographic film, preferably composed of a transparent nitro-cellulose base having upon its face a coating of sensitive material, such as gelatine-argentic emulsion, said strips each being of a length sufficient for one or more exposures in the camera or roll holder, for which the film cartridge is adapted.

B indicates a covering or backing strip of flexible opaque material, such as heavy black paper, to one side of which the film strips A, A¹, A², are fastened at intervals, being secured at one end only, by any suitable fastening means such for instance, as pieces of paper C pasted or glued to the backing B, extending over the perforated or slotted ends of the film strips and also secured by glue to the backing through the perforations, thereby securing the film in such manner that it is not liable to pull out from the fastening when moved forward in use.

The first film strip A is secured at a sufficient distance from the forward end "a" of the paper B as to provide for several convolutions around the complete cartridge to protect it, and also to extend from the supply to the winding spools in the camera for which the cartridge is adapted, and the distance between the rear end of the strip A and the forward end of the strip A¹ and the distance between the rear end of each film strip and the forward end of the succeeding strip is approximately twice as great as that described, so that a multiple film cartridge is formed having a common backing strip B of flexible opaque material to which the film strips are separately applied. The backing strip B is partially divided or weakened at points about midway between the adjacent ends of the film strips, so that the separate strips of film and the backing for them be divided into separate complete cartridges when used in the manner hereinafter described, and the film still be protected from the action of light when applied to or removed from the camera or roll holder. It is preferred to weaken or partially divide the paper backing by forming V-shaped notches *b* at the edges, which not only serves this purpose but also when the backing is severed, leaves tapering ends that may be easily threaded through the slit *c* formed in the spindle of the spool D, like the ends *a* of the backing B, and forms inclined surfaces that are not liable to catch and tear or become folded under when drawn through the camera.

The rear or outer surface of the backing B is provided with suitable numbers *d* and marks Q, as shown in Figure 2, the former indicating the numbers of the separate exposures of film, and the latter the points when the film and paper are to be severed, if it is desired to separate the exposures before development. In the present embodiment of invention each strip of film is shown of sufficient length for two exposures in a camera or roll holder of predetermined size, and the indicating numbers of the backing B are therefore 1 and 2 in the rear of the first strip A, 3 and 4 in rear of the second strip A¹, and 5 and 6 in rear of the third strip A², and so on.

As usual in film cartridges the backing B and film are wound together continuously upon the spool and the full spool is adapted to be placed and centered in the camera or roll holder, and the outer end *a* drawn over the exposing aperture thereof and attached to any empty winding spool by passing it through the slit. The operator winds the backing strip B forward, viewing the numbers through the sight aperture in the usual manner, and if, after having exposed the first film strip A, he desires to remove the exposed film for development, he stops winding when the weakened portion of the backing or a suitable indicating mark, such as the word "exposed" is visible through the sight aperture in the camera, then by opening the camera or holder he may remove the winding spool containing the exposed film which is adequately covered, sever the weakened portion of the backing B and insert the reduced end of the backing into the slot of another winding spool and proceed as before. If the user does not desire to remove the separate exposure before exposing all the film strips, he may wind the backing and film forward continuously and determine by the indicating

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numbers which portions are being exposed, and when he has exposed all of the film in the cartridge.

Cartridges or film rolls such as have been described are found to be very convenient, not only in use but in making, as the backing being marked and cut properly beforehand the operator is only required to secure the ends of the film strips to it at proper intervals.

Of course instead of forming each film strip for two exposures each, one could contain as many as desired, and it is not absolutely necessary that the backing should be weakened at all or in the manner described, although for obvious reasons this is preferable.

The space between the adjacent ends of the film strips will of course vary with the length of film required for exposures and the spool between the roll holding devices, and while under the most favourable conditions with careful manipulation it is only necessary to have a single convolution of the covering strip around the film before and after exposure, it is preferred for safety and in practice to provide more, thus it is found that with a strip of film approximately ten inches long, the covering ends of the backing strip at the ends of the film should be about twenty inches, although these proportions could be varied if desired.

While it is preferred to wind the film and backing upon the ordinary spools having flanged ends, it is not absolutely necessary that such spools be employed as the principal object is to carry and protect the film and to enable portions of the whole amount to be removed without exposing the remainder or resorting to a dark room.

In order to facilitate securing the loose end of the backing strip when a portion containing one or more of the film strips is removed from the camera or holder, small strips *f* of paper containing dried gum, are provided, secured at one end to the outer side of the backing strip and extending across the weakened portion, so that when the backing is severed at the weakened line, the gum on the strip *f* may be moistened and wrapped around the roll of exposed film, holding the loose or free end of the backing and preventing its unwinding. These strips *f* are wound upon the spools with the backing, and if desired, the backing strip might be wholly severed at the weakened portions or two separate backing strips connected, by securing the free ends of the gummed strips *f* thereto as in Figure 4, so that if the operator desired to expose only part of the entire roll or cartridge he could sever the said strip *f* near the end of the second backing strip *B*², as indicated at *g*, and then use the remainder of the gummed strip to fasten the free end of the exposed cartridge having the backing *B*¹. In case it is not desired to separate the two backing strips in the use of the modified construction just described, the strip *f* would serve as a connecting means to draw forward the second backing strip *B*² and form in effect a continuous backing or covering with the strip *B*¹, said strip *f* then forming the weakened portion referred to herein.

Having now particularly described and ascertained the nature of the said invention as communicated to me by my foreign correspondent and in what manner the same is to be performed, I declare that what I claim is:—

1. As an article of manufacture a film cartridge embodying a backing strip of flexible opaque material and a plurality of separate strips of flexible photographic film secured thereto at one end only, said strips and backing being wound together into a continuous roll, the extreme ends of the backing beyond the first and last film strips being of sufficient length to cover and protect the film from light when wound into a roll from either end, and the backing between the strips being of sufficient length to cover and protect from light the film on both sides thereof when severed between the adjacent ends of the film strips.
2. An article of manufacture, a film cartridge embodying a backing strip of flexible opaque material and a plurality of separate strips of flexible photographic film secured thereto, said film, strips and backing being wound together

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into a continuous roll, the backing strip extending beyond the outer ends of the first and last film strips, and having partially divided or weakened portions between the adjacent ends of the film strips.

3. As an article of manufacture, a film cartridge embodying a backing strip of flexible opaque material and a plurality of flexible photographic film strips secured thereto at intervals, said film strips and backing being wound together into a continuous roll, the backing strip extending beyond the outer ends of the first and last film strips and having the narrowed severing portions between the adjacent ends of the film strips, the length of the backing strip between the narrowed portions and the adjacent ends of the film strips being sufficient to form a protecting covering for each film strip when wound into a roll with the backing to which it is secured.

4. As an article of manufacture a film cartridge embodying a backing strip of flexible opaque material and a plurality of separate flexible photographic film strips secured thereto at intervals, said backing strip having markings on its outer side in rear of the film strips indicating the separate exposures of film, and being weakened or partially divided to form severing portions at intervals between the adjacent ends of the film strips, said weakened portions being a sufficient distance from the proximate ends of the film strips to provide several convolutions of the backing around the film strips and backing when wound into a roll together.

5. As an article of manufacture, a film cartridge embodying a spool having flanged ends, a backing strip of flexible opaque material and a plurality of separate strips of flexible photographic film secured at one end to the backing strip at intervals, the backing strip and film being wound continuously together upon the spool with the film inside, the backing strip having markings on the rear side in rear of the film indicating the separate exposures thereof, and being weakened or partially divided between the adjacent ends of the film strips, and at a sufficient distance from said ends to form a covering for the film strips when wound with their backing into a roll, the extreme ends of the backing beyond the first and last film strips being of sufficient length to cover and protect from light all of the film strips when wound with the backing upon a spool.

6. As an article of manufacture, a film cartridge embodying a spool, a film backing or covering of flexible opaque material, and a plurality of separate strips of flexible photographic film secured thereto at intervals the backing being provided with weakened separating portions between the adjacent ends of the film strips and a sufficient distance from said ends to form protecting covering convolutions of the backing around both strips of film to protect them from the action of light when wound into a roll with the backing to which they are attached, and gummed strips attached to the backing on one side of the weakened portions and extending across the latter.

7. As an article of manufacture, a film cartridge embodying a spool, a backing strip of flexible opaque paper and a plurality of separate strips of flexible photographic film secured to the backing at the forward ends only and each film strip containing a plurality of exposures, said backing strip being provided on its outer side with markings corresponding to and indicating the separate exposures of film, the adjacent ends of said film strips being separated by a space at least twice as great as the circumference of the spool when the film and backing wound thereon and the extreme ends of the backing strip extending beyond the outer ends of the film strips a distance at least as great as the circumference of the roll of film and backing when wound upon the spool.

Dated this 1st day of July 1901.

BOULT WADE & KILBURN
Agents for the Applicant.

[This Drawing is a reproduction of the Original on a reduced scale]

